


Review 19 Logistic growth

$$\frac{dP}{dt} = k P (M - P)$$

solution:  $P$  .....  $M = \text{carrying capacity}$   
 $\frac{M}{2}$  ..... inflection point (grows fastest here)  


$$P = \frac{M}{1 + A e^{-k M t}} \quad A = \frac{M - Y_0}{Y_0}$$

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Ex 1  $\frac{dy}{dt} = .1 y (50 - y)$

a) what is  $\lim_{t \rightarrow \infty} y(t)$

b) what is  $y$  when it is growing fastest?

c) How fast is  $y$  growing when it grows fastest?

a) 50

b) 25

c) 62.5

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Ex 2.  $\frac{dP}{dt} = .1 P (1 - \frac{P}{100})$

what is the carrying capacity?

$$\begin{aligned} \frac{dP}{dt} &= .1 P (1 - \frac{P}{100}) \frac{100}{100} \\ &= .1 P (100 - P) \frac{1}{100} \\ &= .001 P (100 - P) \end{aligned}$$

$$M = 100$$

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